Academic Council Meeting No. and Date : 9/ July 2, 2024

Agenda Number : 3 **Resolution Number : 41/ 3.3 B**

Vidya Prasarak Mandal's

B. N. Bandodkar College of Science

(Autonomous), Thane

Certificate Course

Basic Calculus using GeoGebra

With effect from Academic year

2024-2025

PREAMBLE

"Basic Calculus Using GeoGebra" is introduced as a certificate course to be conducted by Department of Mathematics, VPM's B. N. Bandodkar College of Science (Autonomous), Thane. GeoGebra is a dynamic and interactive open source Mathematics software which is very useful to learn and understand different concepts of mathematics like Geometry, Algebra, Calculus, spreadsheets, graphing, statistics and probability.

GeoGebra is useful to make conjectures and to understand proofs of theorems geometrically. In this course, we will revisit the concepts and theorems of basic calculus and understand them geometrically using GeoGebra.

OBJECTIVES OF THE COURSE:

1. To introduce students to the basics of Mathematics software GeoGebra
2. To revise the concepts of basic calculus
3. To understand the basic calculus geometrically with the help of GeoGebra

COURSE OUTCOMES: After completion of this course participant would be able

1. To use the online interface of Mathematics Software GeoGebra
2. To create points, lines and graphs of functions
3. To find limit using graphical representation of a function
4. To analyze the continuity of a function using GeoGebra
5. To understand graphical representations of derivatives and Riemann sums

ELIGIBILITY: Students with Mathematics subject in F.Y.B.Sc.

Course Code: BCCBC038

Course Title: Basic Calculus Using GeoGebra

Syllabus

Course Code : BCCBC038
Course Title : Basic Calculus Using GeoGebra

UNIT	SUB-TOPICS	Lectures	Practicals
I	Graphs, Limit and Continuity 1. About GeoGebra software, About GeoGebra website, How to use the online interface of GeoGebra, Online resources available and how to download and install GeoGebra 2. Creating point, line segment, ray, lines, circles 3. Graphing linear and quadratic functions, Graphs of standard function: $\sin x$, $\cos x$, e^x and $\log x$ 4. Limits: Definition, right hand and left hand limits 5. Continuity, Intermediate value theorem	**5**	**5**
II	Differentiation 1. Slope and tangent 2. Graphing derivatives 3. Mean value theorem	**5**	**5**
III	Integration 1. Riemann Integration, upper sum, lower sum 2. Area below a curve	**5**	**5**

Evaluation Scheme

Theory Examination: Suggested Format of Question paper

Duration: 2 Hours **Total Marks: 60**

All questions are compulsory

Q. 1	Based on Unit I	20
Q. 2	Based on Unit II	20
Q. 3	Based on Unit III	20

Note: Each question may have sub-questions of the type Objectives/True or False/Short Note/Solve the problem.

Internal Assignments have to be submitted in the hard copy format in the department

Total number of assignments: 04 each carrying 10 marks Total marks: 40

Practical Examination

Details	Marks	Viva	Journal	Total
Practical	80	10	10	100

Course Code	Description	Marks
	Total of Internal Assignments	40
	Total of Theory Examination	60
	Total of Practical Examination	100
Total		***200***

Fees

Particulars		**Expenditure**
Course Fee		**1,000/-**
Minimum students	**20**	20,000/-
Course Fee x Minimum no. of students (Total revenue generated)	**A**	**20,000/-**
Course Coordinator		2,000/-
Teacher's payment Rs. 150/- per hour	30 hrs	4,500/-
Non-Teaching Payment Rs. 50/- per hour	30 hrs	1,500/-
Total expenditure	B	8,000/-
Balance income	**(A – B)**	**12,000/-**

Duration

Duration in terms of Hours	30
Per day	3 Hours
No. of days	10
No. of weeks	02
Course will be conducted in the month of	April/May every year

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